BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Qualifications in Engineering
Unit number and title	**Unit 59: Principles of Electrical Machines**
Learning aim(s)	A: Investigate the operation and applications of direct current (DC) electrical machines as used in industry
Assignment number and title	DC electrical machines
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You work as an apprentice in a small engineering company that carries out maintenance activities on a range of electrical machines on behalf of manufacturers. Your Supervisor has asked you to investigate a range of DC electrical machines and to produce a detailed information pack. Your Supervisor has asked you to do this so the manufacturers can refer to this information when discussing the types of maintenance undertaken by your company.

Task 1	You need to research the operation and applications of DC electrical machines. You must use reputable sources of information that can be referenced. At least **three** must be researched, including the following: • DC shunt motor • DC series motor • DC generator. Your research must focus on the following, for **each** DC electrical machine: • their construction • the components used, their purpose and their effect on overall operation • the materials used • underpinning theory, theoretical calculations and standard curves • measurement of speed and torque characteristics • the causes and consequences of overheating and methods used for cooling • conditions for optimum performance • two suitable applications. You then need to produce an information pack for **each** of the three machines. For **each** DC machine, the information pack must include: • an evaluation of how it operates - this must: o include details about how the machine is constructed and the materials used o identify each of the components, including their purpose and their effect on overall operation o accurately cover the measurement of speed and

<table>
<tr><td></td><td>torque characteristics and justify the underpinning theory, theoretical curves and calculations, for example by using different values for input current and voltage
o cover the causes and consequences of overheating and methods used for cooling
o detail the conditions for optimum performance, for example to ensure that the variable loss is equal to the constant loss
• a justification of two suitable applications, based on the evaluation of how the machine operates
• at least three correctly referenced and reputable sources of information, for example a diagram from an online source

[Additional guidance and support - your information pack for each machine must cover:
• DC shunt motor - reasons why it operates at a relatively constant speed
• DC series motor - reasons why it operates at variable speeds
• DC generator - how Faraday’s law applies]</td></tr>
<tr><td>Checklist of evidence required</td><td>• A detailed report/information pack covering each of the three DC electrical machines that includes diagrams, graphs, calculations etc and suitable references.</td></tr>
<tr><td colspan="2">Criteria covered by this task:</td></tr>
<tr><td>Unit / Criteria reference</td><td>To achieve the criteria you must show that you are able to:</td></tr>
<tr><td>59 / A.D1</td><td>Evaluate, using theoretical data, the conditions for optimal performance and suitable applications for three different types of DC electrical machine</td></tr>
<tr><td>59 / A.M1</td><td>Analyse, using theoretical data, the operation of three different types of DC electrical machine</td></tr>
<tr><td>59 / A.P1</td><td>Describe adequately, using theoretical data, the operation of two different types of DC motor and a DC generator</td></tr>
<tr><td>Sources of information to support you with this Assignment</td><td>Books
Sahdev S - Electrical Machines (Cambridge University Press, 2017) ISBN 9781108431064
Edwards J - Electrical Machines and Drives (Palgrave Macmillan, 1991) ISBN 9780333536513

Websites
www.electricaleasy.com/p/electrical-machines.html
www.electrical4u.com/
www.electricalclassroom.com/electric-machines/</td></tr>
</table>